

### 5.16.17 SAMPLING FRESH CONCRETE (Kansas Test Method KT-17)

#### **a. SCOPE**

This method describes the procedures for obtaining representative samples of freshly mixed concrete as delivered to the project site and on which tests are to be performed to determine conformance with quality requirements of the specifications under which the concrete is furnished<sup>a</sup>. This method is applicable to sampling from stationary, paving, truck mixers, and from agitating and nonagitating equipment used to transport central mixed concrete. KT-17 reflects testing procedures found in AASHTO T 141.

**NOTE a:** Composite samples are required by this method, unless specifically excepted by procedures governing the tests to be performed such as tests to determine uniformity of consistency and mixer efficiency. Procedures used to select the specific test batches are not described in this method, but it is recommended that random sampling be used to determine overall specification compliance.

#### **b. REFERENCED DOCUMENTS**

**b.1** AASHTO T 141; Sampling Freshly Mixed Concrete

#### **c. APPARATUS**

**c.1.** Square point shovel.

**c.2.** Wheelbarrow or other suitable water tight container for transporting the sample to the site where it will be remixed and tested.

**c.3.** Metal or plywood sheet or concrete slab on which the concrete can be placed for remixing and testing.

**c.4.** Shade-windbreak combination that will protect the fresh concrete from the sun and wind during testing.

**c.5.** A sample receptacle designed and constructed so that it can be passed through a stream of fresh concrete being discharged from a mixer or agitator.

#### **d. SAMPLE SIZE**

**d.1.** Strength and yield tests: not less than 0.03 m<sup>3</sup> (1 ft<sup>3</sup>). Smaller samples may be permitted for routine air content and slump tests and the size shall be dictated by the maximum aggregate size.

#### **e. SAMPLING PROCEDURE**

**e.1.** The procedures used in sampling shall include the use of every precaution that will assist in obtaining samples that are truly representative of the nature and condition of concrete sampled as follows <sup>b,c</sup>:

**NOTE b:** Sampling should normally be performed as the concrete is delivered from the mixer to the conveying vehicle used to transport the concrete to the forms; however specifications may require other points of sampling, such as the discharge of a concrete pump.

**NOTE c:** As routine air content and slump tests are not readily adaptable to sampling the concrete at two or more regularly spaced intervals during discharge of the middle portion of the batch as specified in this method, the sample for air content, slump, and temperature may be taken after at least one-quarter cubic yard of concrete has been discharged.

**e.1.a** Sampling From Stationary Mixers, Except Paving Mixers: Sample the concrete by collecting two or more portions taken at regularly spaced intervals during the discharge of the middle of the batch. Obtain these portions within the time limit specified in section **e.3**. Composite the portions into one sample for testing purposes. Do not obtain portions of the composite sample from the very first or last part of the batch discharge<sup>d</sup>. Perform sampling by passing a receptacle completely through the discharge stream, or by completely diverting the discharge into a sample container. If the discharge is too rapid to divert the complete discharge stream, discharge the concrete into a container or transportation unit sufficiently large to accommodate the entire batch and then accomplish the sampling in the same manner as given above. Take care not to restrict the flow of concrete from the mixer, container, or transportation unit so as to cause segregation. These requirements apply to both tilting and nontilting mixers.

**NOTE d:** No sample should be taken before 10 percent or after 90 percent of the batch has been discharged. Due to the difficulty of determining the actual quantity of concrete discharged, the intent is to provide samples that are representative of widely separated portions, but not the beginning and end of the load.

**e.1.b.** Sampling from Paving Mixers: The contents of the paving mixer shall be discharged and the sample shall be collected from at least five different portions of the pile. Then composite into one sample for test purposes. Avoid contamination with subgrade material or prolonged contact with an absorptive subgrade, sample the concrete by placing three shallow containers<sup>e</sup> on the subgrade and discharging the concrete across the containers. Composite the samples so obtained into one sample for test purposes. The containers shall be of a size sufficient to provide a composite sample size that is in agreement with the maximum aggregate size.

**NOTE e:** In some instances, the containers may have to be supported above the subgrade to prevent displacement during discharge.

**e.1.c.** Sampling From Revolving Drum Truck Mixers or Agitators: Sample the concrete at two or more regularly spaced intervals during discharge of the middle portion of the batch. Take the samples so obtained within the time limit specified in section **e.2**. and composite them into one sample for test purposes. In any case do not obtain samples until after all of the water has been added to the mixer; also do not obtain samples from the very first or last portions of the batch discharge. Sample by repeatedly passing a receptacle through the entire discharge stream or by completely diverting the discharge into a sample container. Regulate the rate of discharge of the batch by the rate of revolution of the drum and not by the size of the gate opening.

**e.1.d.** Sampling from Open-Top Truck Mixers, Agitators, Nonagitating Equipment, or Other Types of Open-Top Containers: Samples shall be taken by whichever of the procedures described in **e.1.a.**, **e.1.b.**, or **e.1.c.** is most applicable under the given conditions.

**e.2.** Immediately transport the sample to the place where test specimens are to be molded or where the test is to be made, and remix with a shovel the minimum amount that will insure uniformity and compliance with the minimum time limits specified in **e.3**. The sample shall be protected at all times from sunlight and wind.

**e.3.** The elapsed time between obtaining the first and final portions of the composite samples shall be as short as possible, but in no instance shall it exceed 15 minutes.

Tests for air and/or slump shall be started within 5 minutes after sampling is completed. These tests should then be completed as expeditiously as possible. Molding of specimens for strength tests shall be started within 15 minutes after obtaining the sample.

Concrete used in one test may not be reused for any other test. It may be returned to the forms if the maximum time from batching has not been exceeded or adverse conditions have not caused excessive drying of the concrete.

#### **f. DETERMINING TEMPERATURE OF THE SAMPLE**

**f.1.** Determine the temperature of a sample by submerging the thermometer at least 75 mm (3 in) in the fresh concrete. Leave the thermometer in place until the thermometer reading stabilizes, then read and record the temperature. This process should take place within 5 minutes of receiving the sample.